

09728407, 120100

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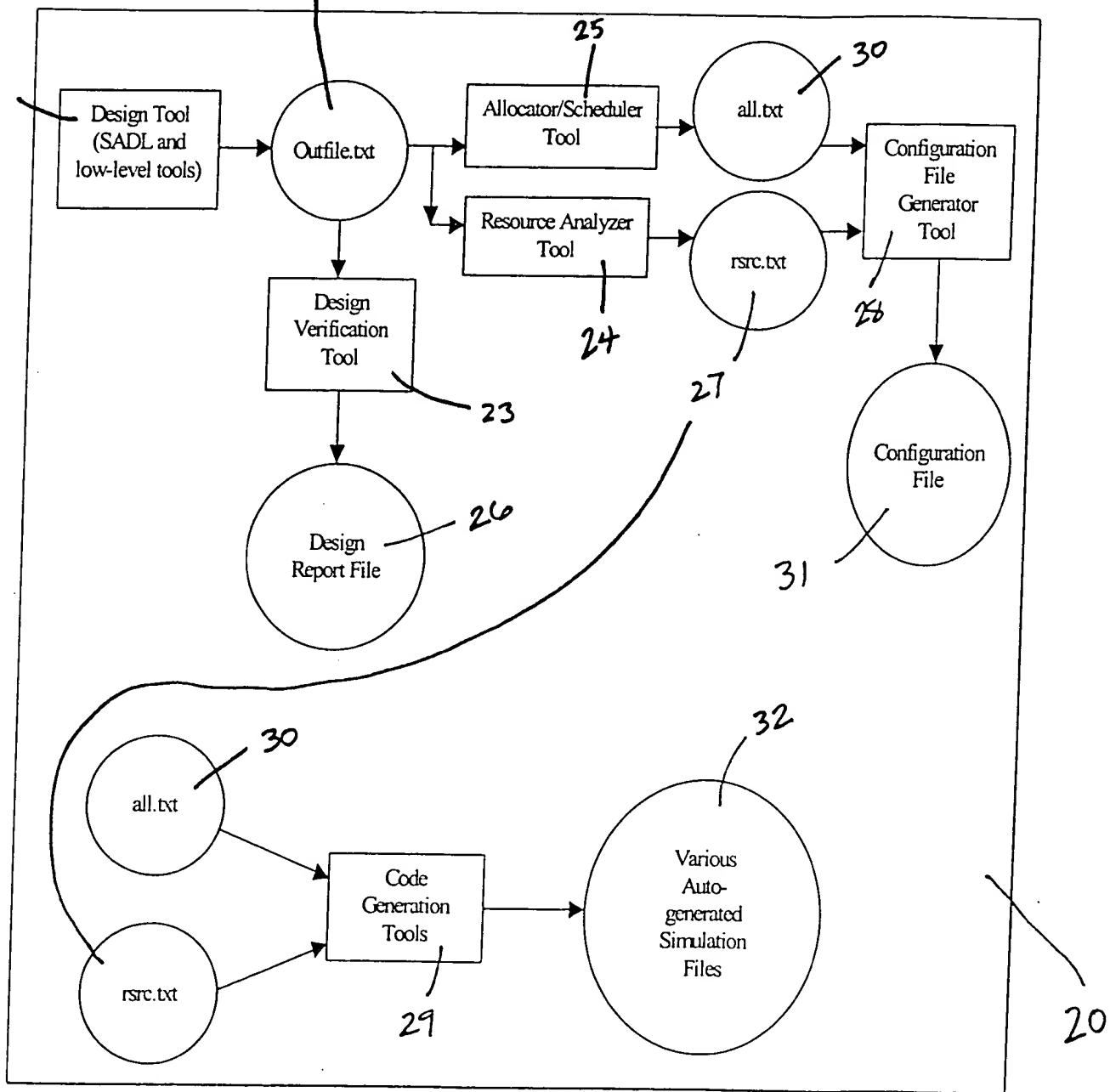


Fig. 2

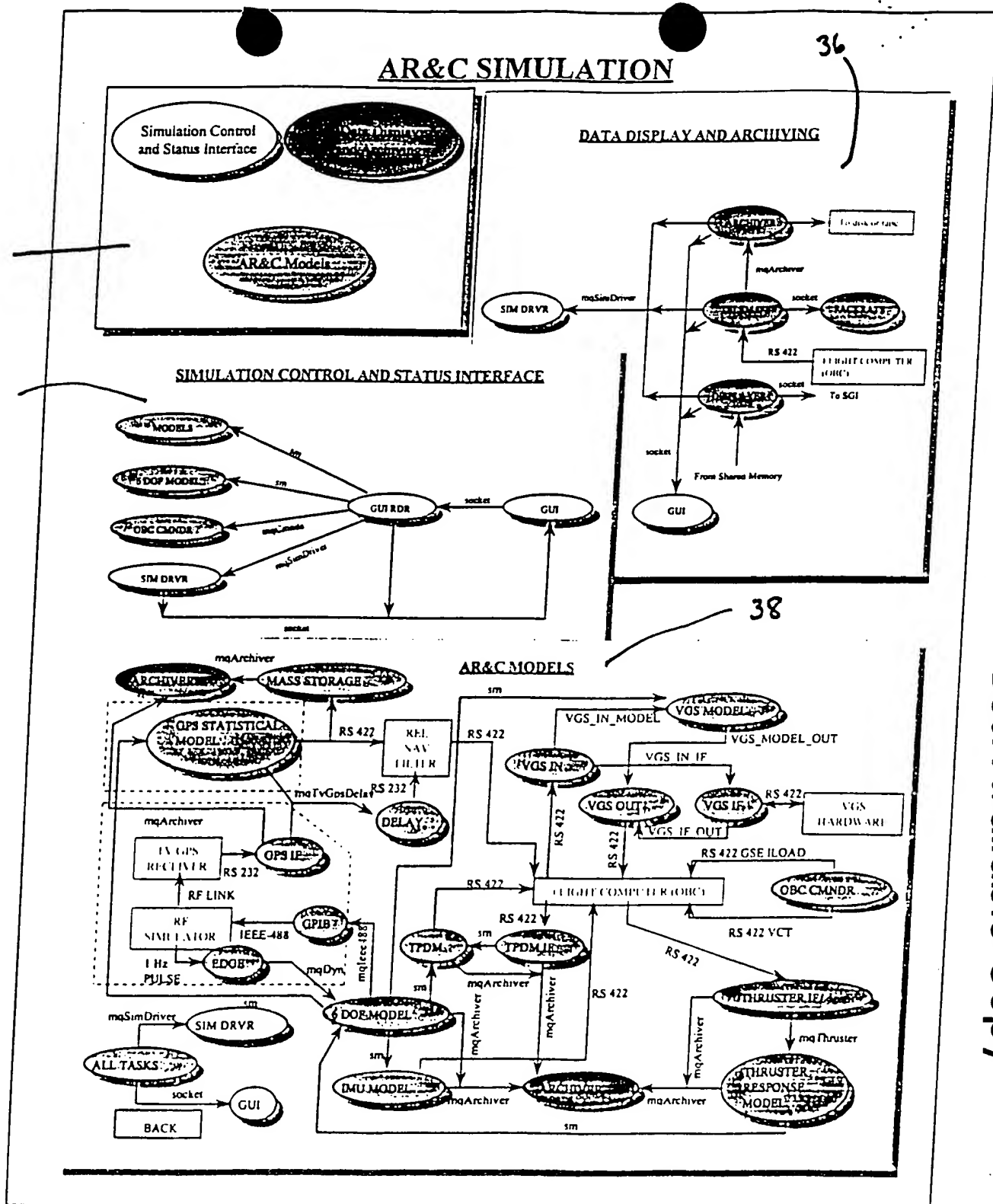


Fig. 3. AR&C Simulation architecture.

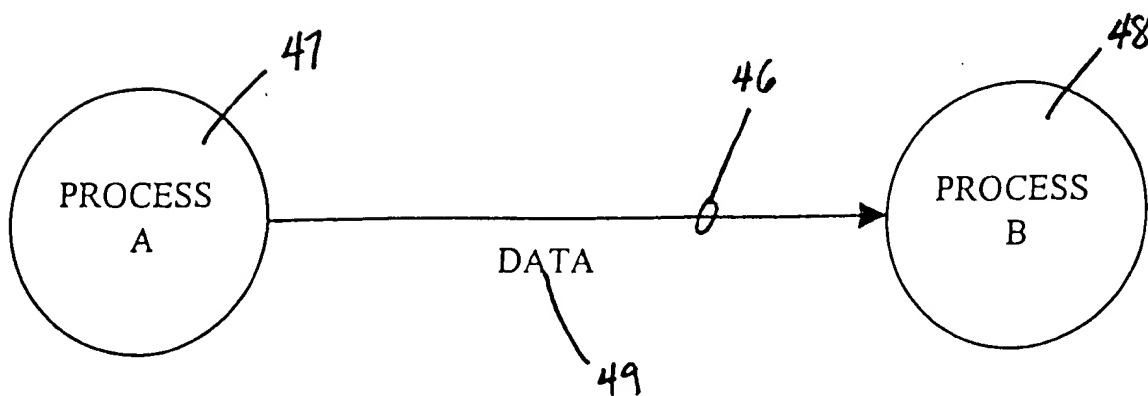
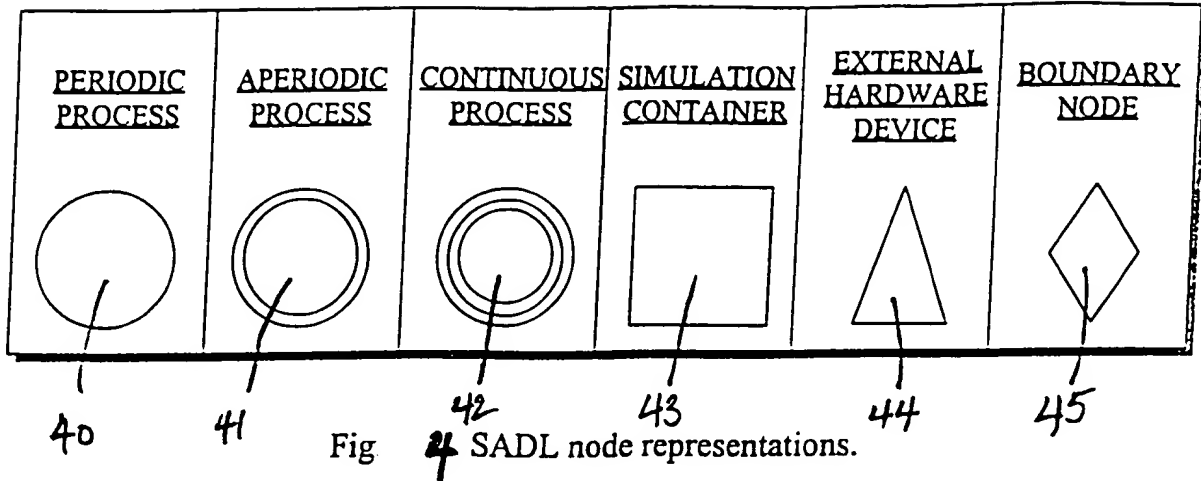


Fig 5 Periodic process A transfers data to periodic process B.

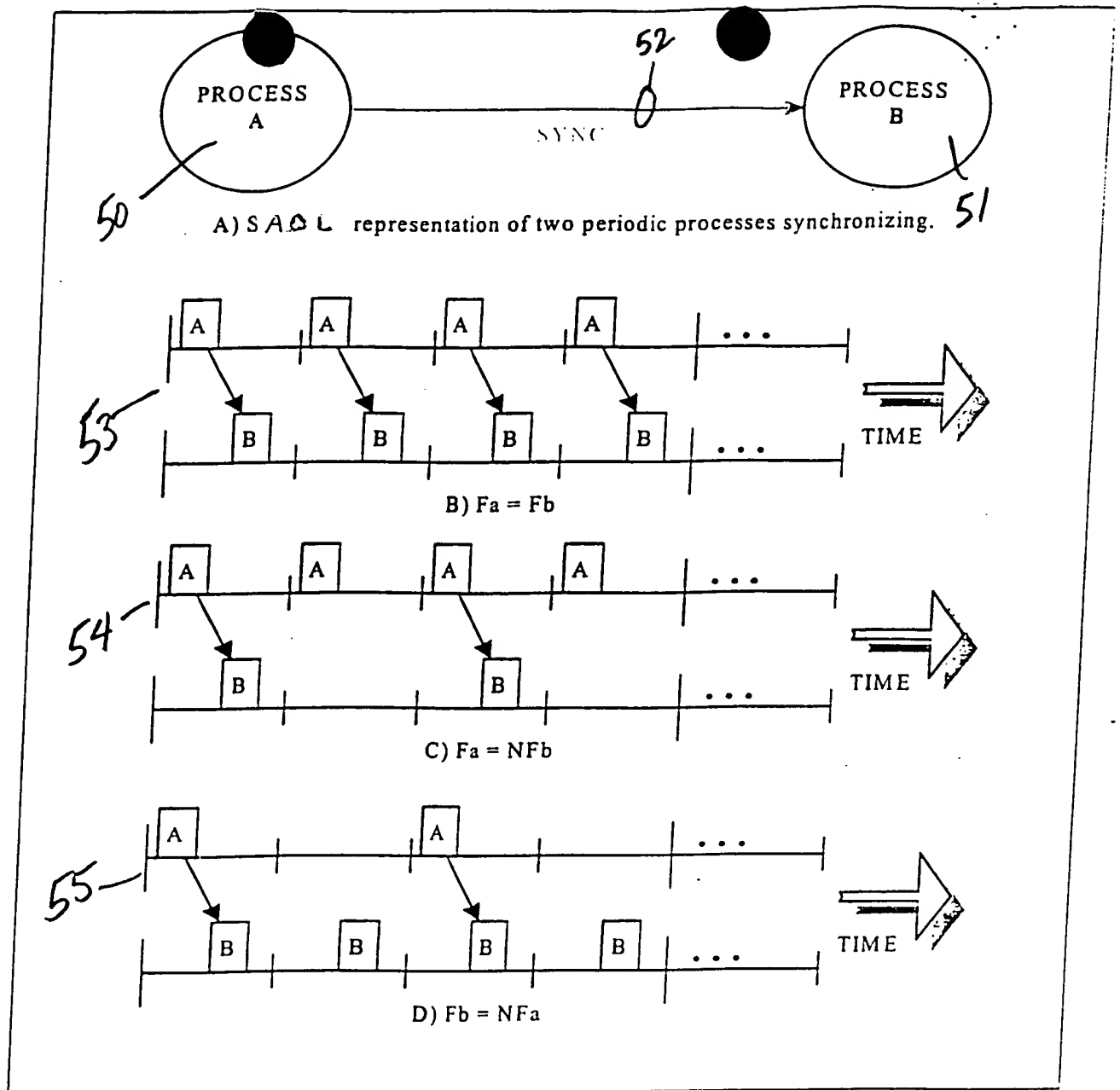


Fig 6. The semantics of two periodic processes synchronizing.

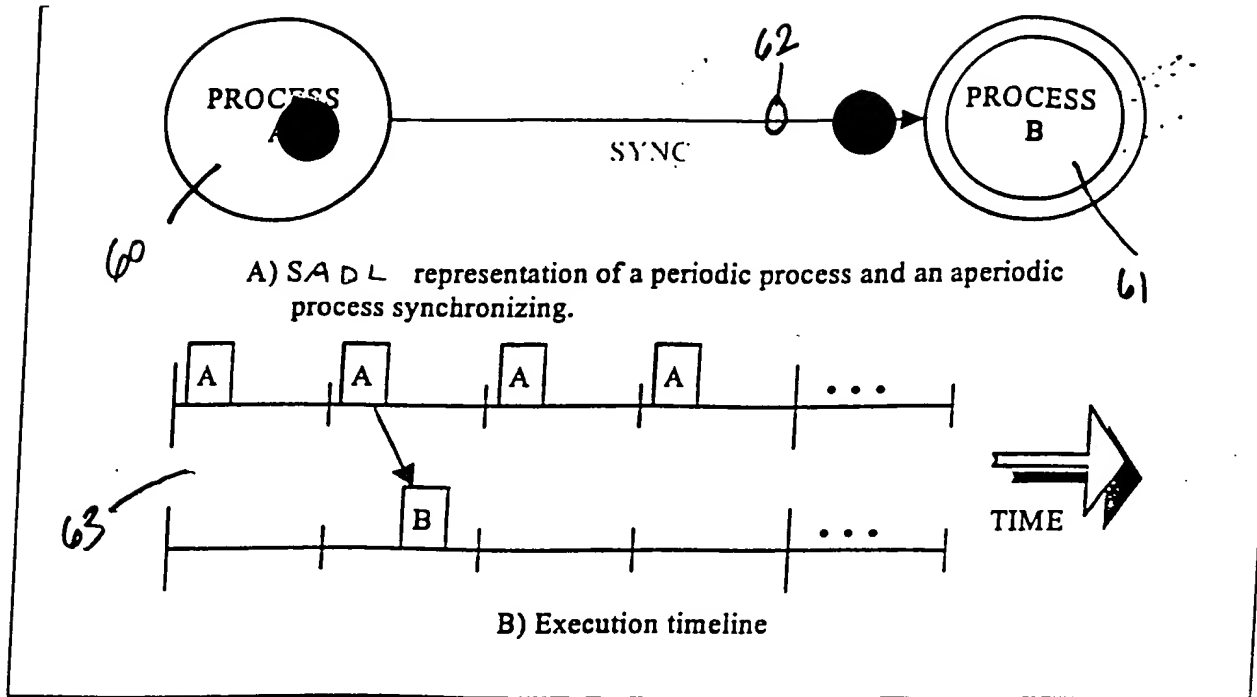


Fig. 7. Aperiodic process B requires synchronization from periodic process A.

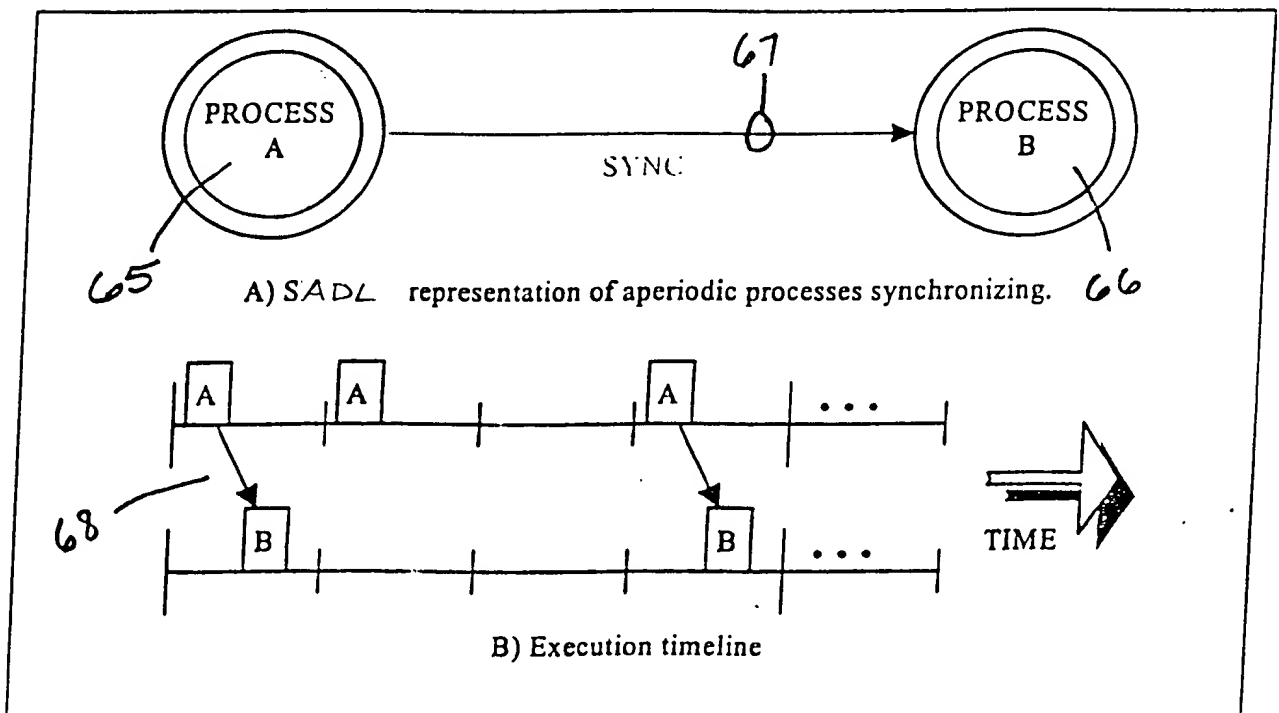


Fig. 8. Synchronization between two aperiodic processes.

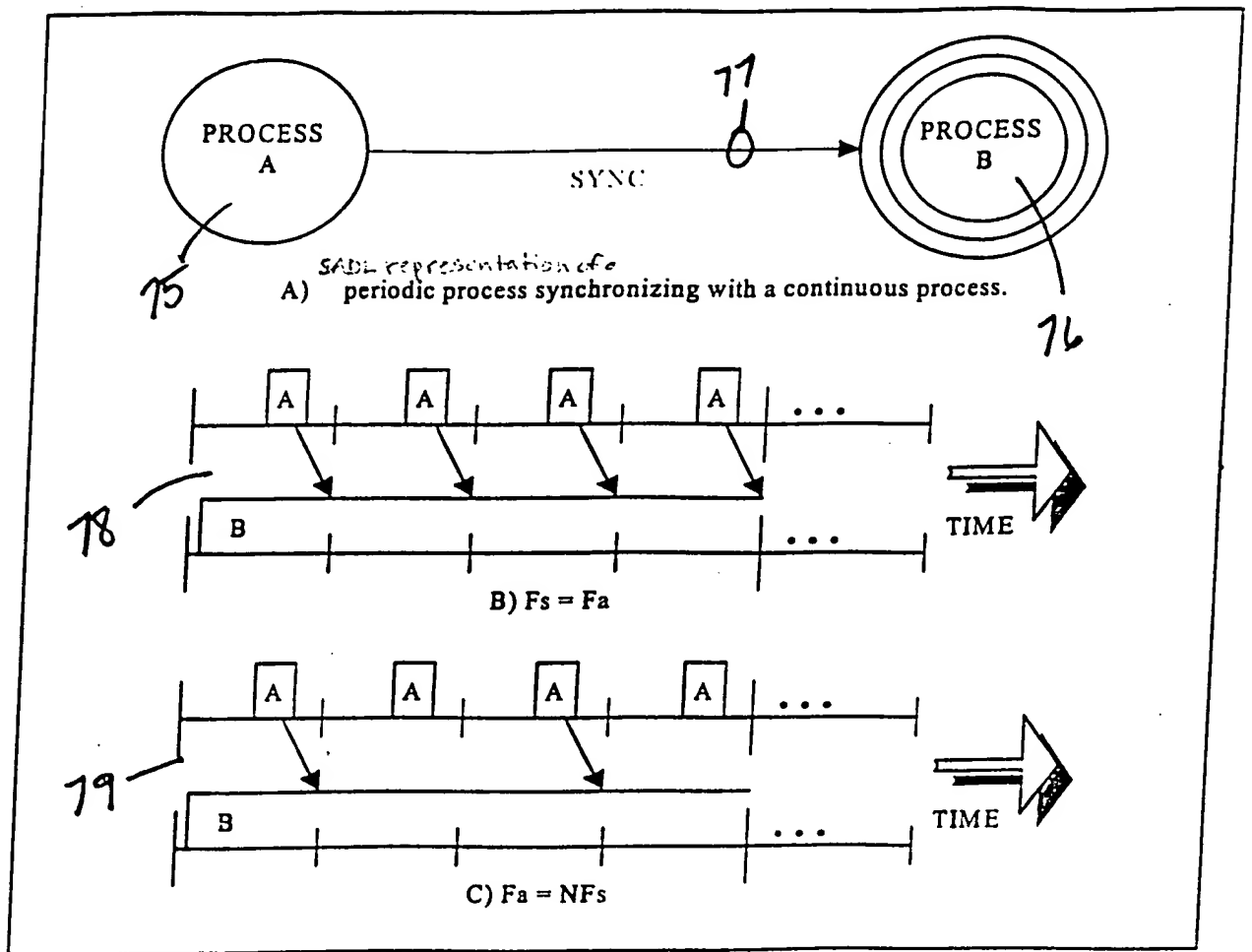


Fig. 10 Synchronization from a periodic process to a continuous process.

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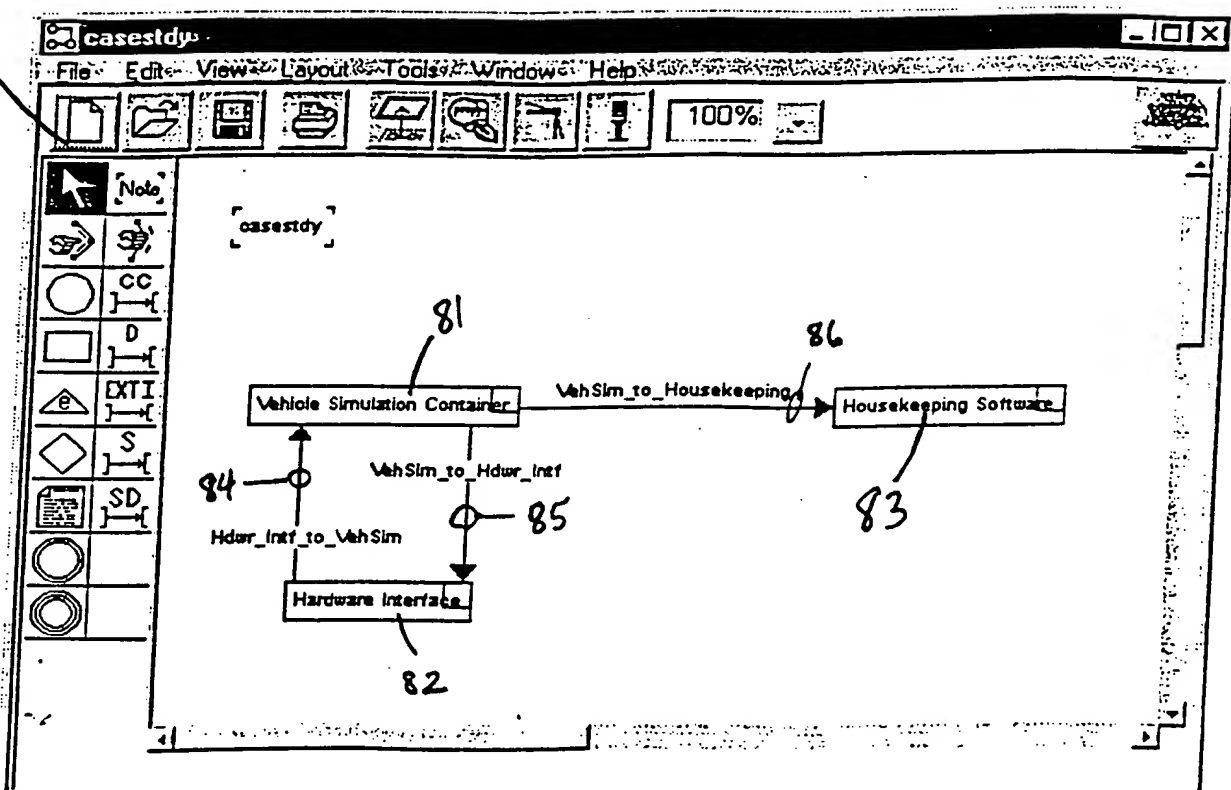


Fig 91 Top-level description of the architecture of the simulation.

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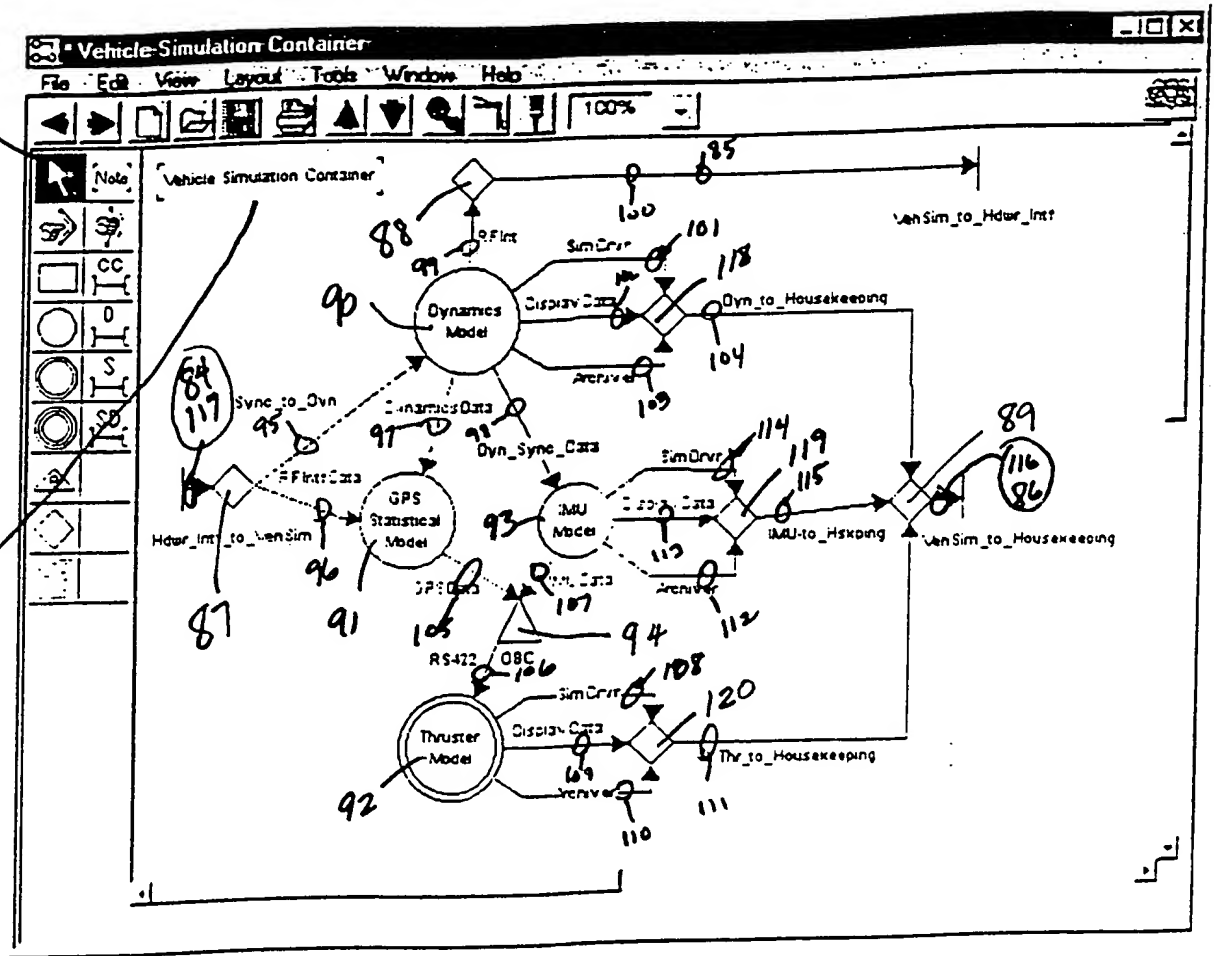


Fig 12 The vehicle simulation portion of the design.

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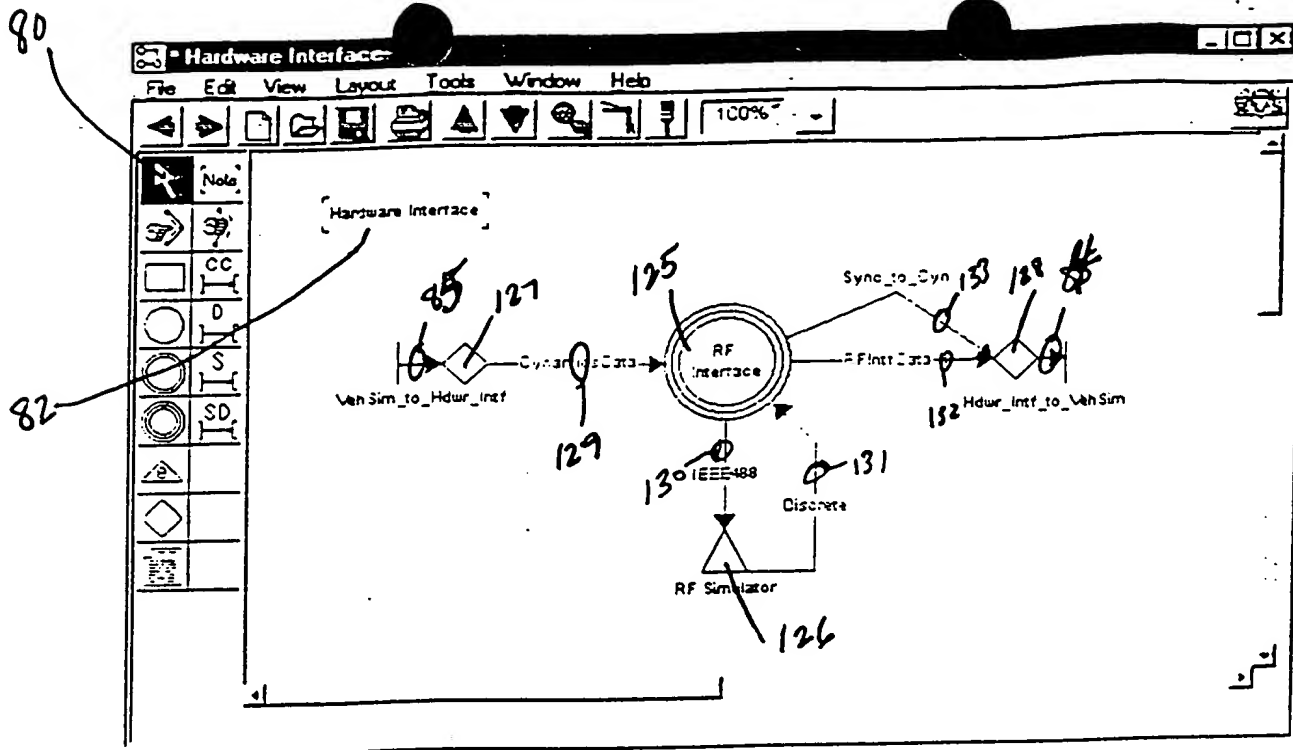


Fig. 13 The hardware interface portion of the design.

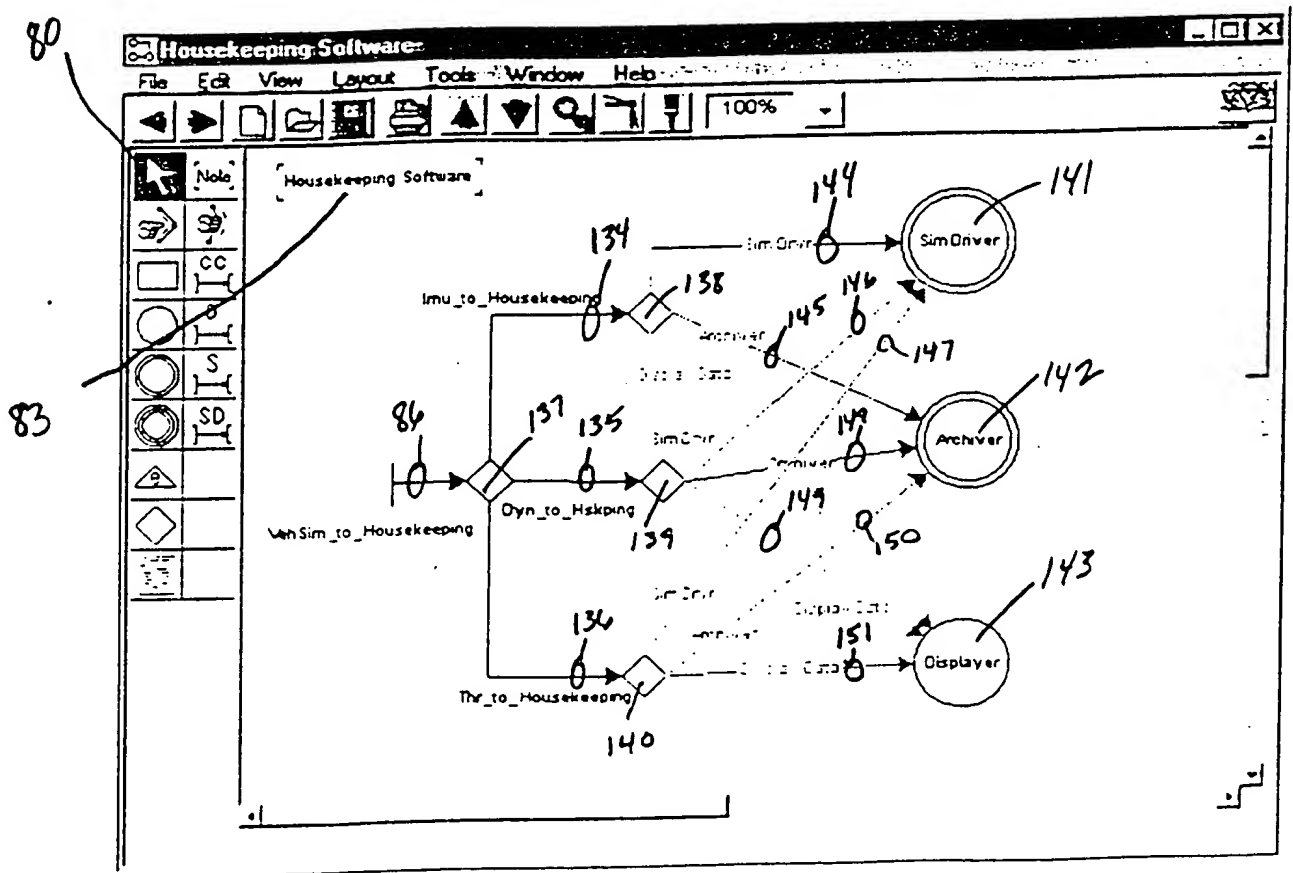


Fig. 14 The housekeeping software portion of the design.

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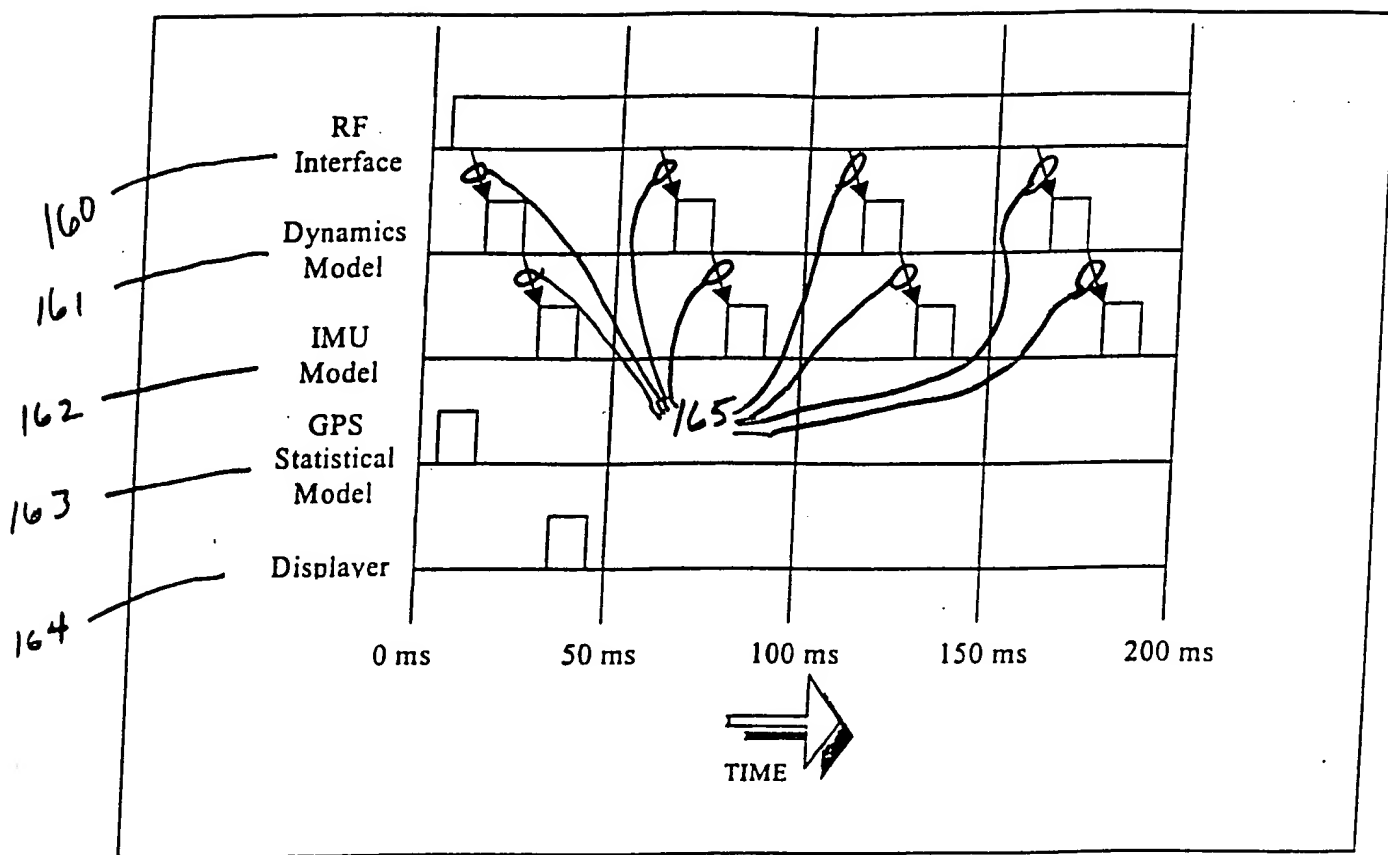


Fig. 15. Execution timeline for AR&C simulation.

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Per process: [File] [Edit] [View]

Name: pp2

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Command line arguments: ☐ []

Duration: ☐ 10

FRS Status: ☐ 0 [] [] []

Pathname: ☐ /home/ricks/

Frequency: ☐ 50

Deadline: ☐ 10

Processor: ☐ 4

[Apply]

Fig. 18

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Per process: [File] [Edit] [View]

Name: pp1

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Command line arguments: ☐ []

Duration: ☐ 10

FRS Status: ☐ 0 [] [] []

Pathname: ☐ /home/ricks/

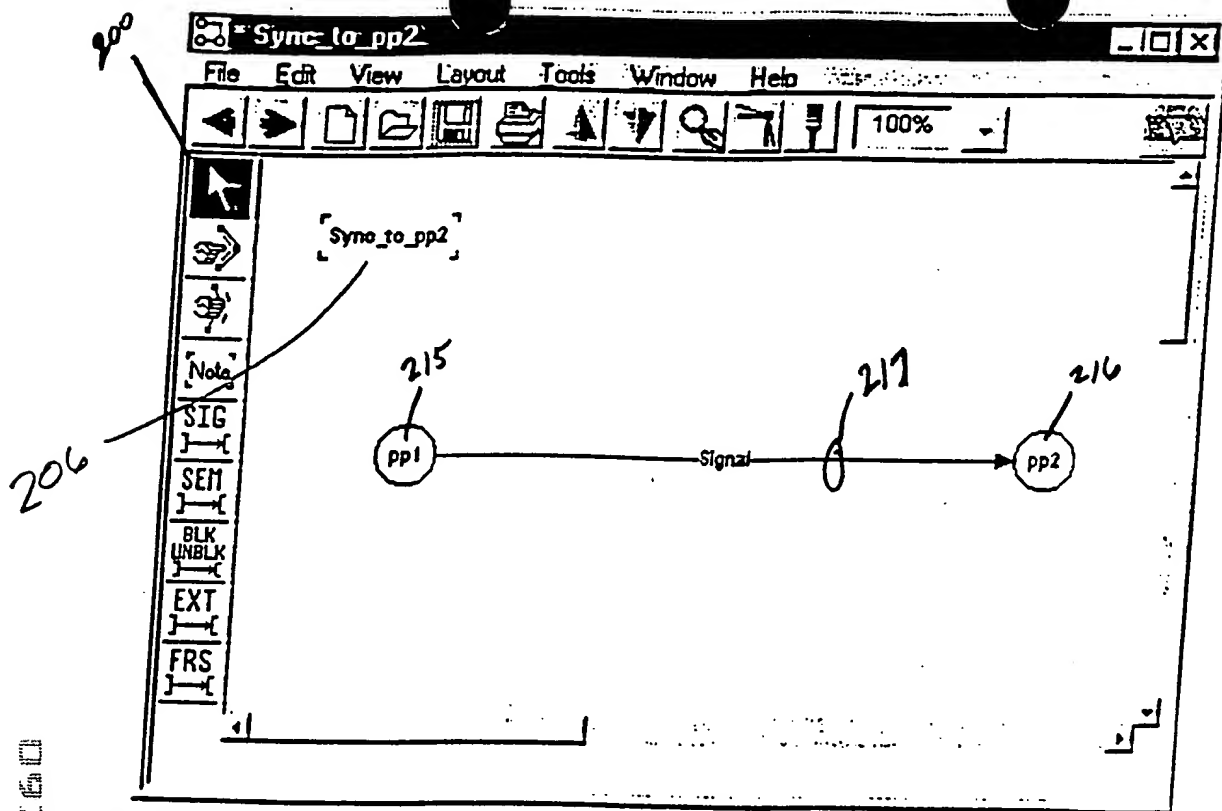
Frequency: ☐ 20

Deadline: ☐ 10

Processor: ☐ 2

[Apply]

Fig. 19



Sync

File Edit View

Name: Sync_to_pp2

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Frequency: 20

Releasetime: 0

Apply

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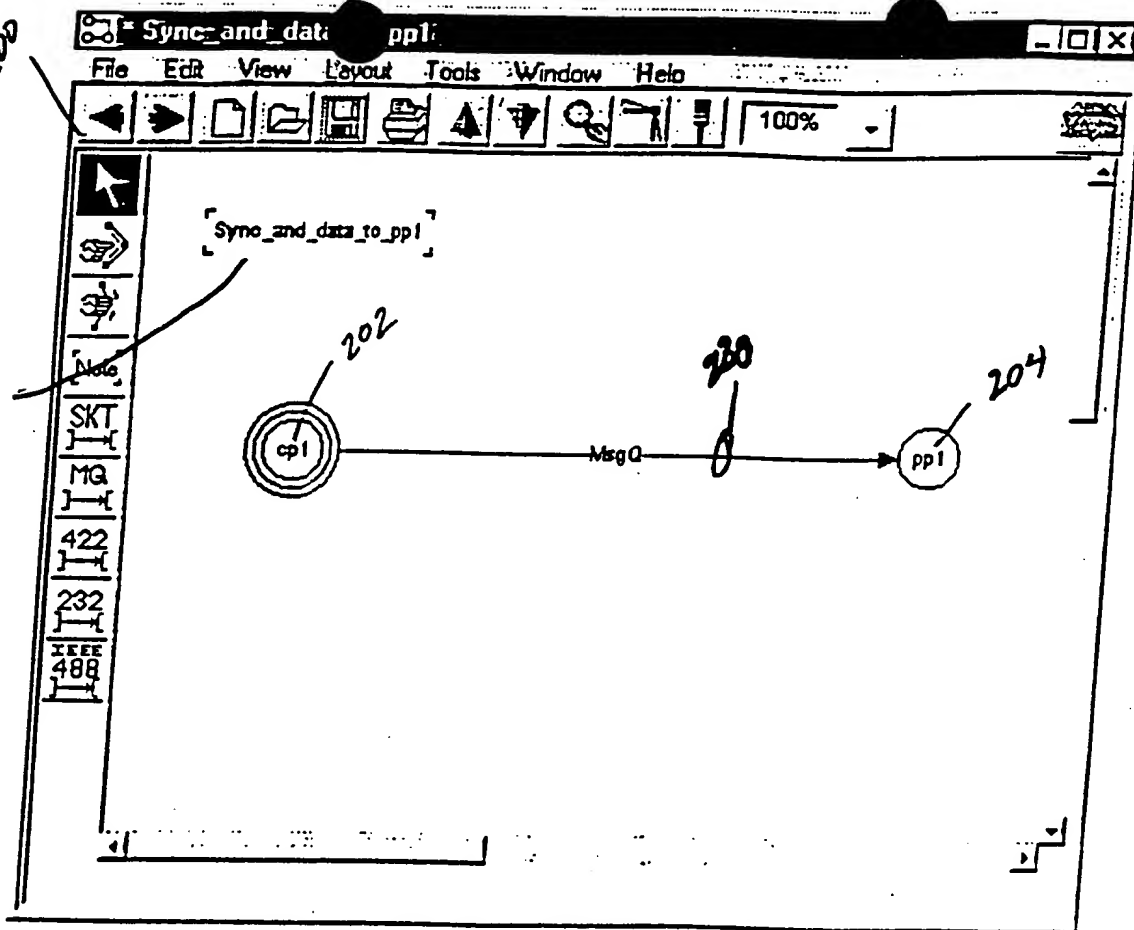


Fig. 24

Name: MsgQ

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Depth: ☒ 1

Data: ☒ nil

Apply

Fig. 25

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Socket

File Edit View

Name: new Socket

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Data: ☒

nil

PortNumber: ☒ 0

Apply

Fig. 26

Best Available Copy

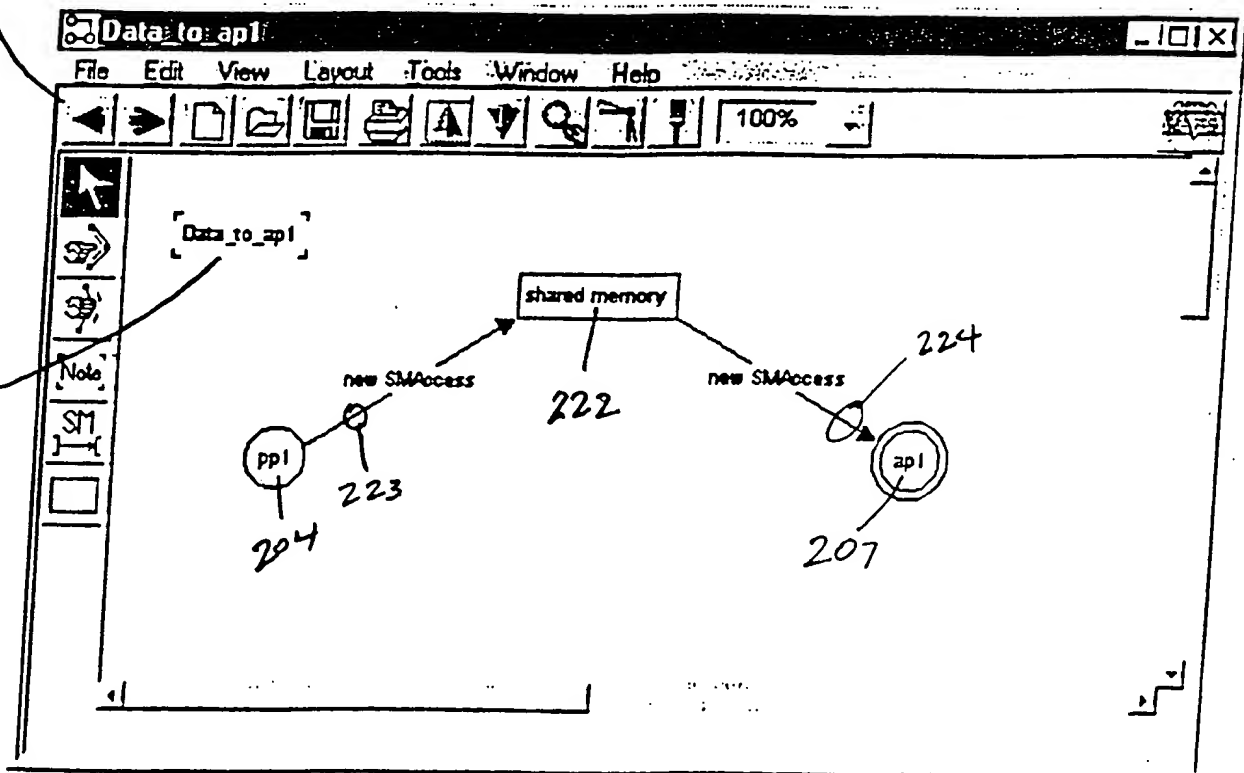


Fig. 27

225

SMAccess

File Edit View

Name: **new SMAccess**

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Data: ☒

Apply

Fig. 28

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SharedMem

File Edit View

Name: **shared memory**

Name	Description	Rationale	Traceability
Color	X-Refs	Overlays	Properties

Data: ☒

Apply

Fig. 29

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```

Per_process "pp1"
  Processor 2
  Priority 0
  Commandlineargs ""
  Pathname "/home/ricks/"
  Frequency 20
  Duration 10
  Deadline 10
  Immediate_Predecessors
"ppp2"
  End_Immediate_Predecessors
  FRSStatus 0
  Incomingarcs
    Sync_and_data_to_pp1
  End_Incomingarcs
  Outgoingarcs
    Data_to_ap1
    Sync_to_pp2
  End_Outgoingarcs
End_Per_process

Per_process "pp2"
  Processor 4
  Priority 0
  Commandlineargs ""
  Pathname "/home/ricks/"
  Frequency 50
  Duration 10
  Deadline 10
  Immediate_Predecessors
"nil"
  End_Immediate_Predecessors
  FRSStatus 0
  Incomingarcs
    Sync_to_pp2
  End_Incomingarcs
  Outgoingarcs
  End_Outgoingarcs
End_Per_process

Aper_process "ap1"
  Processor 3
  Priority 50
  Commandlineargs ""
  Pathname "/home/ricks/"

```

```

Duration 5
Deadline 20
Immediate_Predecessors
"nil"
End_Immediate_Predecessors
Incomingarcs
    Data_to_ap1
End_Incomingarcs
Outgoingarcs
End_Outgoingarcs
End_Aper_process

Cont_process "cp1"
    Processor 1
    Priority 100
    Commandlineargs ""
    Pathname "/home/ricks/"
    Immediate_Predecessors
"nil"
    End_Immediate_Predecessors
    Incomingarcs
    End_Incomingarcs
    Outgoingarcs
        Sync_and_data_to_pp1
        Data_to_external
    End_Outgoingarcs
End_Cont_process

External "external_device"
    Incomingarcs
        Data_to_external
    End_Incomingarcs
    Outgoingarcs
    End_Outgoingarcs
End_External

Data "Data_to_ap1"
    Origin "pp1"
    Destination "ap1"
End_Data

SyncData "Sync_and_data_to_pp1"
    Frequency 20
    Releasetime 0
    Origin "cp1"
    Destination "pp1"

```

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End_SyncData

Sync "Sync_to_pp2"
 Frequency 20
 Releasetime 0
 Origin "pp1"
 Destination "pp2"
 End_Sync

Data "Data_to_external"
 Origin "cp1"
 Destination "external_device"
 End_Data

Signal "Signal"
 Origin "pp1"
 Destination "pp2"
 End_Signal

MsgQueue "MsgQ"
 Origin "cp1"
 Destination "pp1"
 Depth 1
 Data
 "nil"
 End_Data
 End_MsgQueue

Per_process "pp1"
 Processor 2
 Priority 0
 Commandlineargs ""
 Pathname "/home/ricks/"
 Frequency 20
 Duration 10
 Deadline 10
 Immediate_Predecessors
 "ppp2"
 End_Immediate_Predecessors

SECRET

"nil"

Incomingarcs

End_Incomingarcs

End Outgoingarcs

```
SharedMem "shared memory"
```

nil

Incoming arcs

End_Incomingarcs

new SMAccess

End_SharedMem

Origin "pp1"

Data

End Data

End SMAccess

Fig. 30, Page 4

```

End_Data
End_SMAccess

```

SECRET

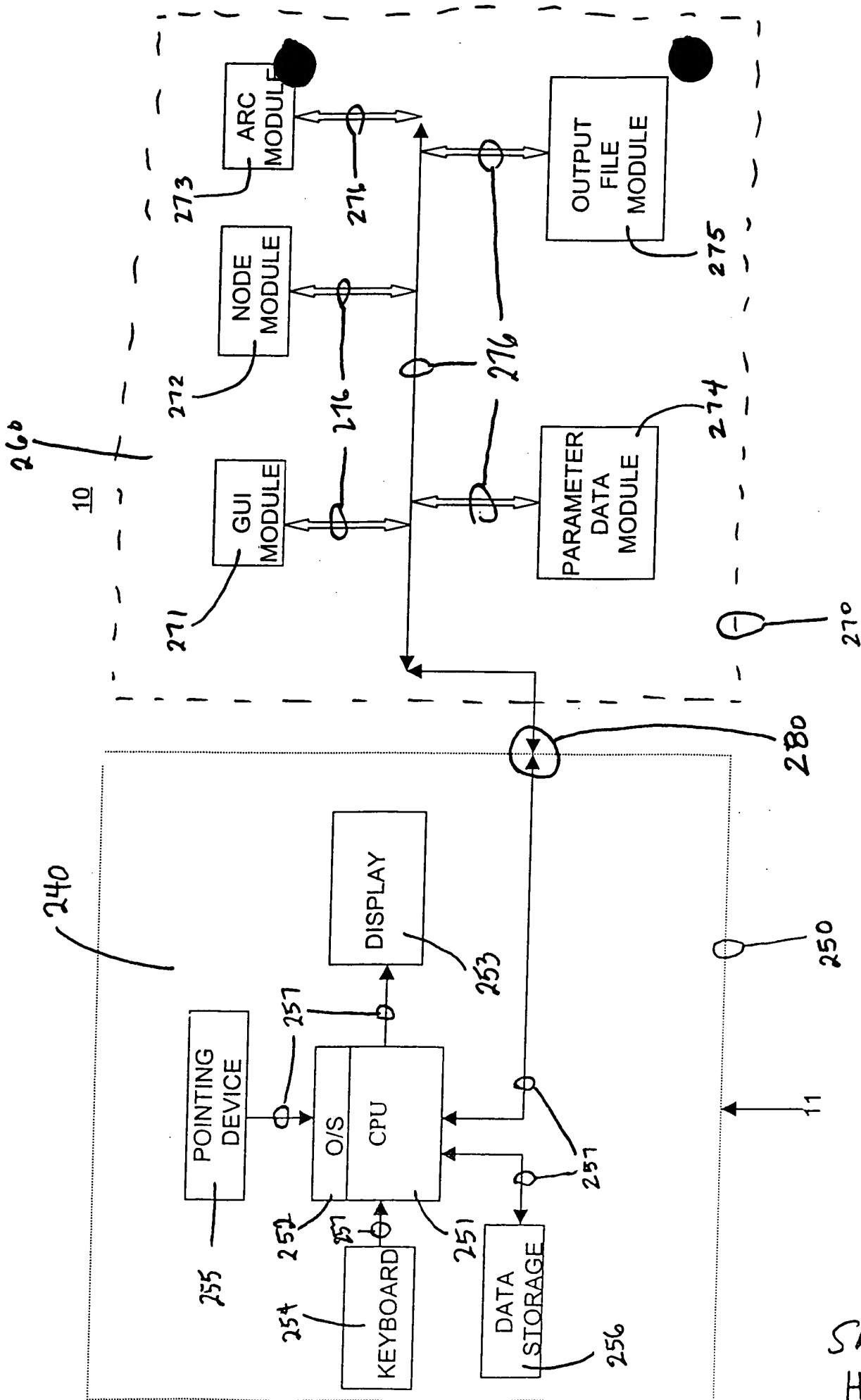


FIG. 31

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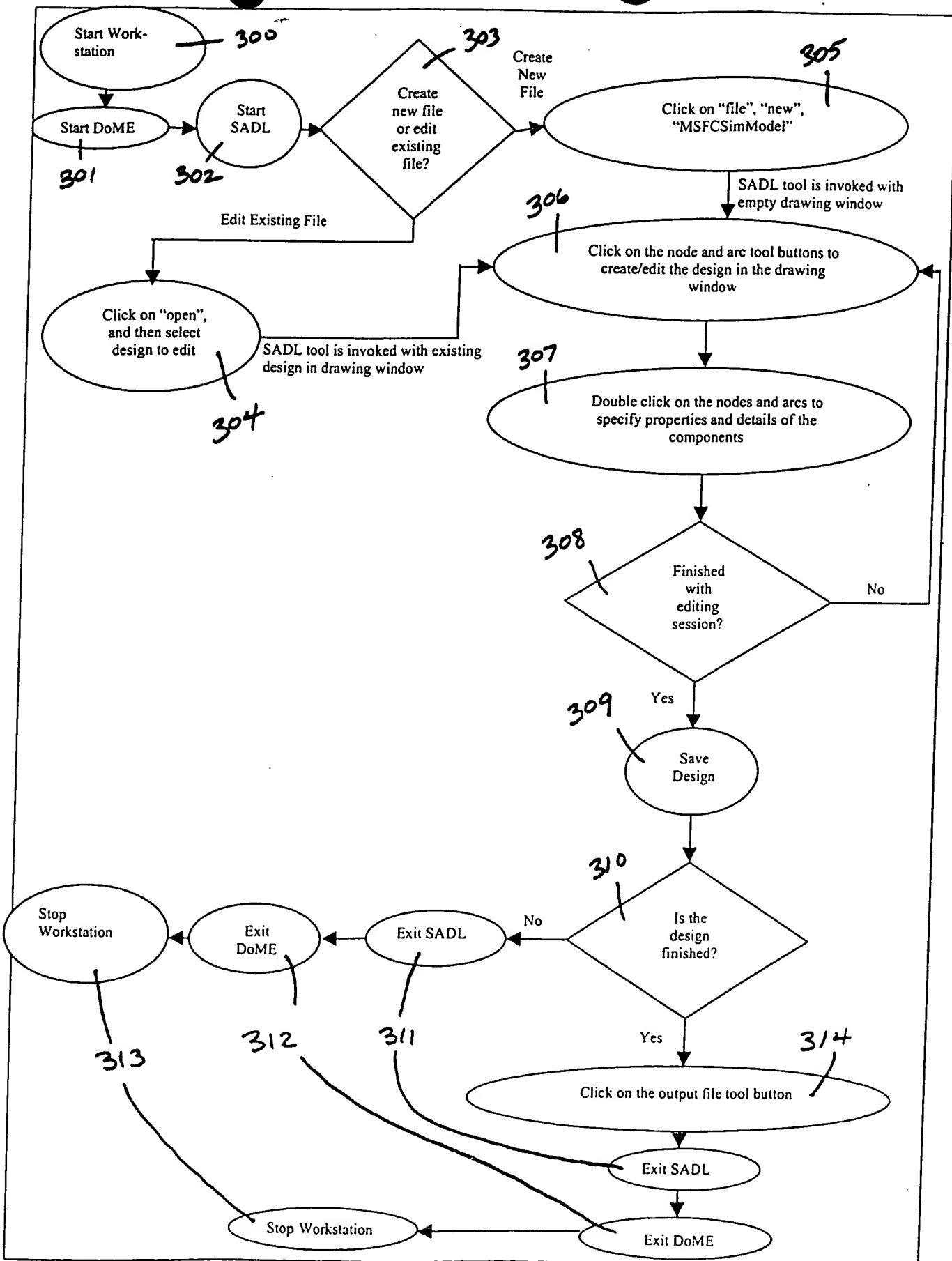


Fig. 32